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## Evaluation of the Tuberculosis Infection Control Training Center, Tajikistan, 2014–2015

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### SUMMARY

**SETTING:** Training center on tuberculosis (TB) infection control (IC) for health care workers in the Central Asian Republics region.

**OBJECTIVE:** To assess the effects of TB IC training courses conducted at the Tuberculosis Infection Control Training Center in Machiton, Tajikistan.

**DESIGN:** Participants who participated in training ( $n = 89$ ) during the first year of operation (April 2014–February 2015) were invited to participate in a post-training interview.

**RESULTS:** Of the 89 participants, 84 (94%) completed the interview and expressed satisfaction with the training. Eighty (95%) participants reported meeting with workplace leadership to discuss the training. Of these, 69 (85%) reported discussing changes required to meet TB IC standards. Self-reported changes in TB IC

practices at work facilities post training included the creation of TB IC committees, designation of a TB IC focal person, TB IC planning, policies to separate infectious patients in waiting rooms, provision of masks for infectious patients, development of cough etiquette policies, improved glove availability, hand hygiene programs, and TB IC posters in waiting rooms.

**CONCLUSIONS:** Participant satisfaction and reported changes in TB IC activities illustrate the potential of these training courses to improve TB IC in the region. Future training courses may be tailored to specific audiences using a structured conceptual framework to impact administration, budgeting, and facilities management of TB IC practices.

**KEY WORDS:** Tajikistan; TB; infection control; training; evaluation

THE CENTRAL ASIA REPUBLICS (CAR) region is composed of five independent countries that were once part of the former Soviet Union: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. Tuberculosis (TB) prevalence in this region is just under 200 cases per 100 000 population, ranging from 88 cases (Turkmenistan) to 196 cases (Kyrgyzstan) per 100 000.<sup>1</sup> The emergence of multidrug-resistant TB (MDR-TB; i.e., TB resistant to at least isoniazid and rifampicin, the two most potent anti-tuberculosis drugs) has become a major concern in the region.<sup>2</sup> Transmission of TB in health care facilities has contributed to the TB burden in the CAR region, and research suggests an occupational risk of TB for health care workers (HCWs),<sup>3–6</sup> particularly in facilities where TB infection control (IC) practices are absent.<sup>6</sup> Dramatic political and economic changes in Tajikistan since the 1990s have made investing in IC measures difficult, and led to a lack of institutional capacity to adequately address TB IC.

To develop human resources to strengthen TB IC practices in the region, Project Hope and the US Agency for International Development (USAID) teamed up with the Ministry of Health and Social Protection of Population Republic of Tajikistan (MoHSPPRT) to establish the Tuberculosis Infection Control Demonstration Site and Base for National Training (TB IC Training Center) at the National Center for Tuberculosis, Pulmonology and Thoracic Surgery in Machiton District, Tajikistan.<sup>7</sup>

A 4-day TB IC course was created in collaboration with the US Centers for Disease Control and Prevention (CDC) and the Vladimir TB Center in Russia. The training course included discussions, group and individual participant work, discussion, and demonstration sessions. Specific topics included TB IC hierarchy (administrative controls, environmental controls, and personal protection equipment) as well as TB IC planning, prioritization, advocacy, implementation, monitoring and evaluation. At the conclusion of the course, participants were expected

to possess the knowledge and skills necessary 1) to identify and describe appropriate TB IC measures based on situational analysis, 2) to plan and design TB IC activities in accordance with national and international IC guidelines, and 3) to conduct monitoring and evaluation activities for TB IC programs (Appendix Table A\*). In 2014, the Center conducted six training courses (one course for trainers and five cascade courses in which the initial group of trainees were the trainers) with participants from Tajikistan. A CAR regional training course was conducted in February 2015, with participants from Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan; the course has been included in this evaluation.

## STUDY POPULATION AND METHODS

### *Study design and population*

To assess the initial impact of the TB IC training, we conducted a cross-sectional post-training evaluation, with an average of 10 months between training completion and evaluation. The eligible study population included all 89 HCWs who attended at least one training course during the period April 2014–February 2015 at the TB IC Training Center at Machiton. Training participants were mailed an introductory letter describing the purpose of the evaluation and the timeframe during which they would be contacted by study staff to complete an interview. A standardized interview questionnaire was developed based upon the first two objectives of the training curriculum, which anticipated that by the end of the training participants would be able to 1) identify and describe appropriate TB IC measures, and 2) plan and design TB IC activities.

The questionnaire contained close-ended demographic questions, as well as questions to assess knowledge retention, sharing of training information, and changes implemented in TB IC practices at the participant's workplace. Knowledge retention by participants was assessed using the same pre- and post-training knowledge test used for each training course. Knowledge scores were calculated for each participant as a percentage of questions with correct answers out of the total number of questions in the test. The questionnaire also included open-ended questions inviting participants to provide concluding comments or recommendations regarding the training center and program. Questions were written in English and translated into Russian and Tajik. The interview questionnaire was reviewed and approved by Project Hope and training center staff responsible for the development and conduct of the TB IC training.

### *Data collection*

Interviews were primarily conducted in person in Russian or Tajik, based on the language preference of the participant, by trained interview staff. For participants unable to meet in person, interviews were conducted over the phone. Interview staff transcribed the participants' responses into English for analysis.

### *Data analysis*

Data were entered into an Epi Info™ database (Centers for Disease Control and Prevention, Atlanta, GA, USA) by trained staff and then reviewed and compared to the original study documents by the study coordinator for accuracy. Cumulative scores were calculated from items evaluating TB IC knowledge. Quantitative analyses, including descriptive statistics, were conducted in SAS (Statistical Analysis System, Cary, NC, USA). Thematic qualitative analysis was performed by two staff members identifying and comparing themes, with any discrepancies resolved by the study coordinator.

### *Ethics*

The study received approval from the Regional Director Europe/Eurasia of Project Hope and from USAID, Washington DC, USA. The project was determined not to be human subject research by the US CDC and did not require approval by an institutional review board. Verbal informed consent was obtained from all participants before interviewing.

## RESULTS

### *Participant characteristics and work facilities*

At the time of evaluation, 89 HCWs had participated in a training course at the training center during its first year of operation. A total of 84 participants completed the interview (94% participation rate). Of the five participants not included in this evaluation, the contact information for two participants was incorrect, two participants refused to participate, and one participant terminated the interview early for reasons not clear to the interviewer.

Just under half ( $n = 35$ , 42%) of the participants reported a TB center or TB hospital as their current workplace (Table 1). Sixty (71%) participants had more than 4 years of work experience at their facility. Almost 70% of the participants reported having administrative responsibilities, and 24% reported budgeting responsibilities. Fifty-one participants (60%) reported the training course to be their first on TB IC.

### *Knowledge retention*

TB IC knowledge scores improved from pre-training to immediate post-training across all training partic-

\* The appendix is available in the online version of this article, at <http://www.ingentaconnect.com/content/iuatld/ijtd/2017/00000021/00000005/art00017>

**Table 1** Demographics and workplace information of evaluation participants ( $n = 84$ )

Characteristic	$n$ (%)
Sex	
Male	38 (45)
Female	46 (55)
Country	
Tajikistan	81 (96)
Kyrgyzstan	1 (2)
Kazakhstan	2 (2)
Type of workplace	
TB center	22 (26)
Public health center	21 (25)
TB hospital	13 (15)
Epidemiological center	11 (13)
Health department	4 (5)
Medical university	4 (5)
Laboratory	3 (4)
Penitentiary medical facility	1 (1)
National hospital	1 (1)
Other	4 (5)
Time worked at facility, years ( $n = 82$ )	
<1	7 (8)
1–3	16 (19)
4–6	18 (21)
7–10	10 (12)
>10	31 (37)
Administrative responsibilities	
Yes	58 (69)
No	26 (31)
Budgeting responsibilities	
Yes	19 (23)
No	65 (77)
Previous IC training	
This was the first training	51 (60)
1–2 other training courses	19 (23)
≥3 other training courses	14 (17)

ipants (Table 2), with an average absolute improvement of 48 percentage points at post-test. Compared to post-test scores, knowledge scores decreased by an average of 35 percentage points at the time of the evaluation. Training of trainer participants (trained in April 2014) demonstrated the highest mean knowledge retention scores of all training cohorts, with the last regional CAR cohort demonstrating the next highest mean knowledge retention scores.

#### *Sharing training information*

Participants were asked if they shared the information they learned at the TB IC course upon returning to their work facility, as this may reflect retained knowledge and engagement in, and perceived value of, the training. Among the 84 participants, 80 (95%) reported meeting with their workplace leadership to discuss their experience at the training (Table 3). Of those, 69 (86%) reported that they had conveyed the need to make changes at their workplace to meet the TB IC standards they had learned during the training.

#### *Changes in tuberculosis infection control practice*

Participants were asked to describe IC practices at their work facility both before and after they attended

the TB IC course. These questions aimed to demonstrate whether the TB IC course encouraged participants to plan and design TB IC activities at their work facility (Figure 1). Nine participants who identified themselves as not working in a facility providing laboratory or clinical services were not included in this analysis.

The changes reported by participants varied, and included the organization of TB IC activities, changes in facility policies, and staff and patient education. The proportion of participants who reported that a designated staff member was leading IC activities at their facility increased from 28 (37%) before to 55 (73%) after the training. Twenty-eight (37%) participants reported a TB IC committee or group at their workplace before they attended the training compared with 55 (65%) after the training. Participants also reported increases in IC measures and activities at the time of evaluation in work facilities that had IC guidelines ( $n = 39$ , 52% before training vs.  $n = 70$ , 93% after training), offered TB IC training to all facility staff ( $n = 34$ , 45% before training vs.  $n = 62$ , 83% after training), and implemented a hand hygiene program ( $n = 67$ , 89% before training vs.  $n = 74$ , 99% after training). Smaller improvements in TB IC practices were observed in the use of personal protective equipment, environmental controls, and risk assessments. For example, 45 (60%) participants reported having N95 respirators available for staff at their work facility before the training compared to 66 (88%) after the training. While the availability of N95 respirators is important, so is fit-testing these respirators: only 13 (17%) participants reported having a fit-testing program for staff before the training. During the evaluation, this improved slightly to 20 (27%) participants reporting a fit-test program. Glove availability also increased after training ( $n = 73$ , 97% vs.  $n = 75$ , 100%). Finally, the number of participants conducting annual risk assessments of TB transmission at their workplace increased after training from 48 (64%) before to 61 (81%) after.

#### *Barriers to implementation of tuberculosis infection control and recommendations for training improvement*

Participants discussed barriers they had experienced initiating or implementing IC practices at their work facilities following the TB IC training (Figure 2). Among the participants who responded to these questions, the most frequently mentioned barrier was related to budget, finance, and funding ( $n = 29$ , 35%) for IC activities, followed by environmental challenges ( $n = 13$ , 14%), and lack of staff knowledge of TB IC ( $n = 13$ , 14%). The top three suggestions for improving TB IC training included providing additional TB IC training ( $n = 16$ , 30%), advanced skills and refresher training ( $n = 14$ , 26%), and expanding

**Table 2** Tuberculosis Infection Control Training Center pre- and post-test assessment scores and evaluation knowledge retention scores

	Pre-test* %	Post-test† %	Follow-up evaluation‡ %
All training participants (2014–2015)	(n = 89)	(n = 89)	(n = 84)
Median [IQR]	33 [22–56]	89 [78–100]	48 [36–67]
Mean	38	86	51
Mode	22	100	64
Training of trainers (17–14 April 2014)	(n = 15)	(n = 15)	(n = 12)
Median [IQR]	50 [44–58.5]	100 [89–100]	77 [64–83]
Mean	51	96	73
Mode	44	100	64
Cascade training (24–26 June 2014)	(n = 12)	(n = 12)	(n = 12)
Median [IQR]	22 [22–56]	100 [83.5–100]	50 [46.5–59]
Mean	35	92	50
Mode	22	100	50
Cascade training (6–8 August 2014)	(n = 13)	(n = 13)	(n = 13)
Median [IQR]	22 [11–33]	78 [67–89]	39 [32–43]
Mean	24	79	37
Mode	22	67	46
Cascade training (20–22 August 2014)	(n = 11)	(n = 11)	(n = 11)
Median [IQR]	11 [11–53]	95 [80.8–100]	38 [36–59.3]
Mean	26	90	46
Mode	11	100	36
Cascade training (17–19 September 2014)	(n = 12)	(n = 12)	(n = 12)
Median [IQR]	39 [30.3–56]	100 [89–100]	40 [23.3–46]
Mean	42	96	37
Mode	22	100	46
Cascade training (22–24 September 2014)	(n = 13)	(n = 13)	(n = 13)
Median [IQR]	33 [33–44]	89 [83.5–89]	61 [37.5–64.5]
Mean	37	86	50
Mode	33	89	61
CAR training (10–12 February 2015)	(n = 15)	(n = 12)	(n = 12)
Median [IQR]	44 [33–72.5]	78 [67–89]	63 [41.3–77.8]
Mean	47	76	59
Mode	33	89	43

\* Conducted immediately prior to TB IC training.

† Conducted immediately following TB IC training.

‡ Conducted 1–10 months after TB IC training.

IQR = interquartile range; CAR = Central Asian Republics; TB = tuberculosis; IC = infection control.

the type of staff invited to training courses ( $n = 6$ , 11%) (Figure 3).

#### Participant satisfaction

In response to a question asking participants for final comments or their overall perception of the training courses, participants reported being generally satisfied with the TB IC training provided by the training center and a desire to attend additional training courses in the future. Twenty-seven participants (39%) reported that the training was useful or good; another eight (10%) requested that this training be offered to work colleagues and/or all medical staff working in facilities; and five (6%) reported wanting more training courses offered. All interviewed participants (100%) also agreed that they would be interested in attending additional courses if invited by the training center.

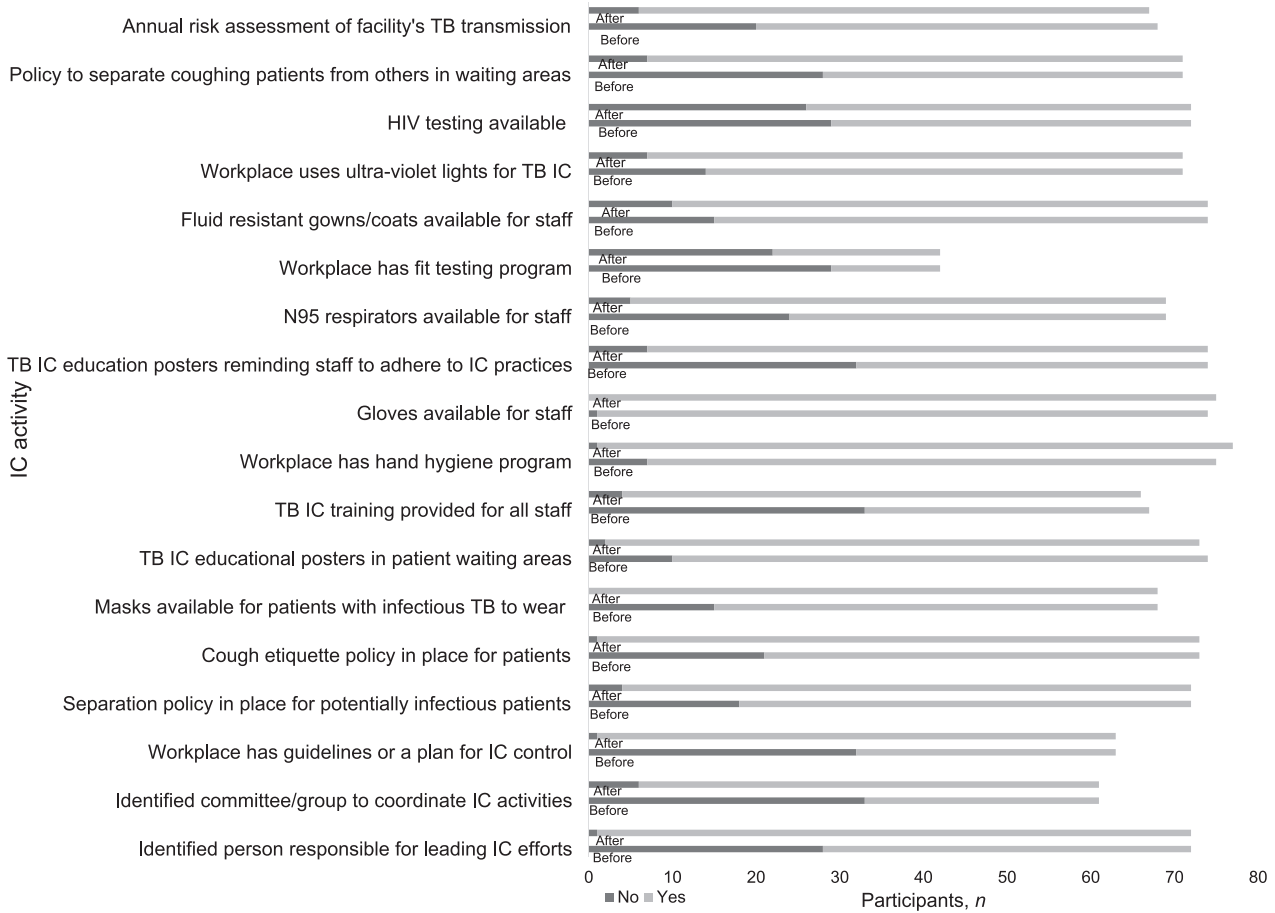
## DISCUSSION

This evaluation sought to assess participants' knowledge retention, sharing of training information, and

changes in IC activities at participants' workplaces following TB IC training courses conducted during the first year of operation of the TB IC National Training Center. Findings from this evaluation illustrate the potential for such courses in reducing nosocomial transmission of TB in the CAR region. This has important implications in a setting where MDR-TB rates are some of the highest globally,<sup>2</sup> and where infection rates and prevalence of TB disease in HCWs are not well studied or documented.

An important aim of these courses was to effect positive change in TB IC practices. Results suggest that participants were motivated to return to their work facility and engage with facility leadership and work colleagues to share their knowledge about TB IC principles and practices, and potential improvements within their physical work facilities. The training also appears to have had a positive impact on TB IC practices in the participants' workplaces, particularly with regard to increased uptake of administrative controls.

This evaluation also identified opportunities to improve the TB IC training courses provided at



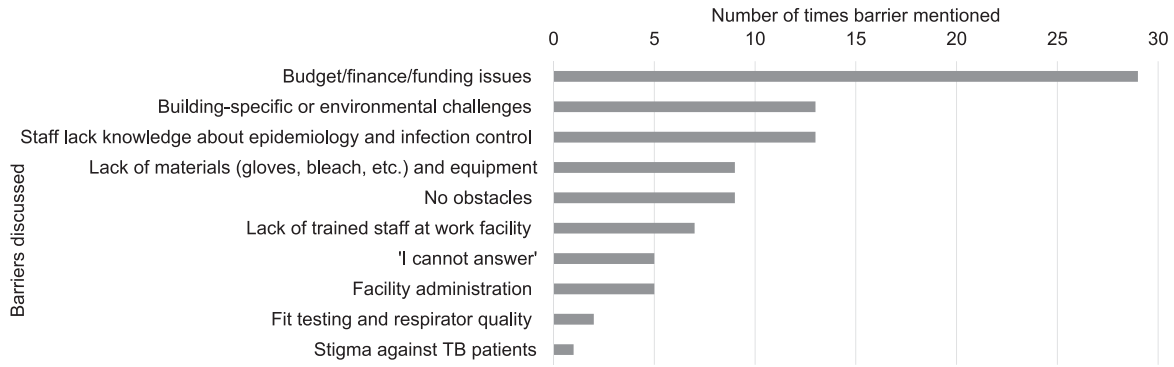
**Figure 1** Changes in facility TB IC practices before and after the TB IC training, as reported by participants. TB = tuberculosis; HIV = human immunodeficiency virus; IC = infection control.

**Table 3** Training participant leadership meetings, facility changes discussed, and dissemination of training information among colleagues (n = 84)

Activity	n (%)
When you returned from the IC course, did you meet with leaders in your workplace to discuss the training?	
Yes	80 (95)
No	4 (5)
During the meeting did you discuss the need to make changes in your workplace according to the information acquired? (n = 80)	
Yes	69 (86)
No	11 (14)
Have any of these changes been made? (n = 69)	
Yes	16 (23)
No	55 (77)
After the training, did you share what you learned with colleagues at your workplace?	
Yes	83 (98)
No	1 (2)
When you shared information, was this during informal conversations with co-workers or during formal presentations to a group?	
Informal conversations	37 (45)
Formal presentations (e.g., meeting, lecture)	46 (55)
Number of formal presentations given, median [IQR]	2 [1–4]
Number of people who attended a formal presentation, median [IQR]	22 [15–60]

IC = infection control; IQR = interquartile range.

Machiton. For example, participants noted that limited financial resources hindered the expansion of TB IC practices. Given that one quarter of the participants reported responsibility with budgeting at their work place and that 77% reported that no TB IC changes were made in their work facility after discussing needed changes with facility leadership, it may be beneficial to create a TB IC course specifically aimed at facility leadership to increase knowledge and awareness of TB IC, budgeting needs, and innovative TB IC possibilities. Moreover, expanding training invitations to include staff from all departments, including administration and facilities maintenance, and tailoring training content to these professionals' work responsibilities, may increase TB IC awareness and engagement throughout health facilities. Participants' limited knowledge retention of TB IC principles and practices observed during the evaluation indicate the potential advantage of tailored training courses. While some regression in knowledge scores over time is expected,<sup>8</sup> the average decrease of 35 percentage points may reflect a lack of information utility. Training participants were primarily care providers and epidemiologists, with more than half (60%) of participants receiving their first



**Figure 2** Participant identified barriers to implementing IC. TB = tuberculosis; IC = infection control.

exposure to TB IC principles during the training. The knowledge questions most frequently missed were those focusing on technical concepts and environmental and/or engineering interventions required, which are not part of the routine work of these professionals.

*Future directions*

Future TB IC training curriculums should be developed using behavioral theory and mapped to evaluation conceptual frameworks to ensure rigor and replicability. Curriculums may also benefit from the inclusion of a module dedicated to participants' development of a TB IC action plan with short-, mid-, and long-range goals for their workplaces.<sup>9,10</sup> The module could guide participants to broaden the type of staff with whom they share TB IC messages and information, to tailor the plan to facility-specific needs, to identify accountable facility-specific persons responsible for tasks and activities, to outline timeframes for task and activity completion, and to address potential implementation barriers. Furthermore, the creation of a TB IC peer network program along with the provision of didactic courses may enable participants to remain connected, both to the training center and to each other, after a course is finished, without requiring time and travel for additional training. A formalized peer network would provide a platform for participants to share experiences, brainstorm and problem solve together, and

provide motivational support with each other despite physical distance.

*Limitations*

This evaluation is subject to several limitations. First, the evaluation focuses on the first year of training operations. The majority of training center participants and evaluation respondents were from Tajikistan. Responses and findings may thus be more reflective of this country and into not the CAR region as a whole. Although generalizability may be limited, this is the first training program evaluation conducted in the CAR region. Greater insights into participant competencies post-training and into training impact may be acquired through the use of a structured conceptual framework to guide the planning, implementation, and evaluation of future training. Participants may have provided socially acceptable answers rather than providing a constructive critique of the training they attended.<sup>11</sup> Finally, this evaluation collected self-reported changes in TB IC practices from participants, which are subject to both recall and social desirability bias.<sup>11</sup>

**CONCLUSIONS**

Training participants self-reported disseminating the TB IC training information to colleagues at their work facilities and positive changes in TB IC practices, particularly administrative controls. As



**Figure 3** Participants' comments and suggestions for improvement. UV = ultraviolet; IC = infection control.

the TB IC demonstration site in Machiton continues to provide TB IC training for the CAR region, the content of future training courses may be tailored to the job responsibilities of course participants, and expanded to guide participants in planning for change at their workplaces. The target audience of TB IC training may also be expanded to include administrators and facilities maintenance staff. A structured conceptual framework should be used to guide these changes to the curriculum.

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## APPENDIX

**Table A** Curriculum of the TB IC training conducted at the TB Infection Control Demonstration Site and Base for National Training at the National Tuberculosis Center, Pulmonology and Thoracic Surgery, Machiton District, Tajikistan

	Training topics and content	Presentation format
<p>Framework used to guide the training: WHO policy on infection control in health-care facilities, congregate settings and households</p> <p>Training objectives:</p> <p>At the end of the training course, participants were expected to be able to:</p> <p>Select appropriate IC-related activities and measures in their settings based on situational analysis</p> <ul style="list-style-type: none"> <li>• Conduct risk assessments on airborne infections at the facility level to reduce TB transmission</li> <li>• Recommend necessary TB IC interventions during exchanges with peers</li> </ul> <p>Adult learning principles incorporated into the training:</p> <ul style="list-style-type: none"> <li>• Feasible learning objectives</li> <li>• Lectures start with basic information and work towards complexity</li> <li>• Guiding questions used to draw out knowledge</li> <li>• Facilitated discussions</li> <li>• Case studies</li> <li>• Participants asked to share relevant experiences</li> <li>• Small group discussions</li> <li>• Small group interactions</li> </ul>	<p>Domain</p> <p>Introduction</p> <p>Topic: Overview of TB control</p> <p>Contents:</p> <ul style="list-style-type: none"> <li>• The incidence and impact of TB and TB-HIV in the world</li> </ul> <p>Topic: Basics of TB infection and transmission</p> <p>Contents:</p> <ul style="list-style-type: none"> <li>• The cause of TB and its characteristics</li> <li>• Risk factors favouring TB transmission</li> </ul> <p>Topic: TB IC: the hierarchy/package of interventions</p> <p>Contents:</p> <ul style="list-style-type: none"> <li>• Rationale for and importance of TB IC</li> </ul> <p>Topic: Managerial activities</p> <p>Contents:</p> <ul style="list-style-type: none"> <li>• Define managerial activities at the facility level</li> <li>• Components of managerial interventions</li> </ul> <p>Establish coordinating body for TB IC</p> <p>Improve facility design</p> <p>TB surveillance</p> <p>Monitoring and evaluation</p> <p>Operational research</p> <p>Topic: TB IC implementation framework</p> <p>Contents:</p> <ul style="list-style-type: none"> <li>• Implementing the WHO policy on TB IC framework</li> </ul>	<p>• Powerpoint presentation</p> <p>• Discussion sessions</p> <p>• The incidence and impact of MDR-TB in world</p> <p>• The Stop TB plan</p> <p>• Tuberculous infection vs. TB disease</p> <p>• Evidence that HCWs are at risk of tuberculous infection</p> <p>• Introduction to the hierarchy</p> <p>• Of TB IC measures</p> <p>• Factors to consider in assessing the risk of TB transmission in a facility</p> <p>• Elements of a TB IC plan</p> <p>Case study: Risk assessment</p> <p>• Powerpoint presentation</p> <p>• Discussion sessions</p>

**Table A** (continued)

Domain	Training topics and content	Presentation format
Administrative controls: policies, procedures, and enforcement measures to prevent exposure to disease-causing organisms	<p>Topic: Administrative controls</p> <p>Contents:</p> <ul style="list-style-type: none"> <li>• An explanation of administrative controls and why they are important to implement</li> <li>• Examples of administrative controls in health care settings</li> </ul> <p>Topic: Case study: Rwanda</p> <p>Contents:</p> <ul style="list-style-type: none"> <li>• Programmatic and existing TB IC measures were presented. Epidemiological trends and findings from operational research were discussed</li> <li>• Situational analysis with challenges and possible solutions were reviewed</li> </ul> <p>Topic: TB IC facility plans</p> <p>Contents:</p> <ul style="list-style-type: none"> <li>• Why IC plans are needed</li> <li>• Elements of a TB IC plan</li> <li>• IC committees</li> <li>• Risk assessments</li> </ul> <p>Classification of transmission risks</p> <p>Prioritizing TB IC interventions</p> <p>Topic: Environmental (engineering) Controls—Introduction</p> <ul style="list-style-type: none"> <li>• Role of environmental controls</li> <li>• Types of environmental control measures</li> <li>• Prioritizing environmental control actions</li> </ul> <p>Topic: Environmental (engineering) controls—ventilation</p> <p>Contents:</p> <ul style="list-style-type: none"> <li>• Ventilation characterization</li> <li>• General dilution ventilation</li> <li>• Airflow rate and air changes per hour</li> <li>• Natural ventilation</li> <li>• Wind-driven (horizontal) natural ventilation</li> <li>• Buoyancy-driven (vertical) ventilation</li> </ul> <p>Topic: Environmental (engineering) controls—UVGI</p> <p>Contents:</p> <ul style="list-style-type: none"> <li>• Description of and use for UVGI</li> <li>• Examples of upper-room UVGI fixtures</li> </ul> <p>Topic: Environmental (engineering) controls—filters and RACs</p> <p>Contents:</p> <ul style="list-style-type: none"> <li>• Description and use of filters and room air cleaners</li> <li>• Collection efficiency and penetration</li> </ul> <p>Topic: Biosafety in the TB laboratory</p> <p>Contents:</p> <ul style="list-style-type: none"> <li>• General basic principles of biosafety</li> <li>• Biosafety levels in a laboratory</li> <li>• Good laboratory practices, both general and specific</li> </ul>	<ul style="list-style-type: none"> <li>• Powerpoint presentation</li> <li>• Case studies/practical exercises</li> <li>• Group/individual work</li> <li>• Discussion sessions</li> </ul> <ul style="list-style-type: none"> <li>• Describe administrative measures to protect HCWs from TB transmission</li> <li>• Identification of persons with TB symptoms</li> <li>• Separation of infectious patients</li> <li>• Respiratory hygiene</li> </ul> <ul style="list-style-type: none"> <li>• Building capacity for IC</li> <li>• Training HCWs in IC</li> <li>• Evaluating the TB IC plan</li> <li>• Infection control indicators</li> </ul> <p>Contents:</p> <ul style="list-style-type: none"> <li>• Design and planning environmental controls</li> <li>• Ventilation</li> <li>• Principles of maintenance</li> </ul> <ul style="list-style-type: none"> <li>• Wind turbines</li> <li>• The effect of propeller fans on ventilation</li> <li>• Mechanical ventilation</li> <li>• Mixed mode ventilation</li> <li>• Safety and ventilation</li> <li>• Evaluating ventilation</li> </ul> <ul style="list-style-type: none"> <li>• Measurement of UVGI</li> <li>• Safety and maintenance of UVGI</li> </ul> <ul style="list-style-type: none"> <li>• Types of filters</li> <li>• Maintenance of filters</li> <li>• Types of RACs</li> <li>• Evaluation of RACs</li> </ul> <ul style="list-style-type: none"> <li>• Selection and use of appropriate biosafety control measure</li> <li>• Aspect of internal risk assessment and self-inspection of the laboratory</li> </ul>

**Table A** (continued)

Domain	Training topics and content	Presentation format
Respiratory protection controls: the use of personal protective equipment to reduce risk for exposure to infectious droplet nuclei that have been expelled into the air from a patient with infectious TB disease	Topic: Basic components of infection control Contents: <ul style="list-style-type: none"> <li>• Hand hygiene</li> <li>• Types of personal protective equipment</li> </ul> Gloves Gowns/aprons Eyewear Masks and respirators for HCWs and visitors Masks for patients  Topic: Personal respiratory protection Contents: <ul style="list-style-type: none"> <li>• Rationale for the use of masks and respirators</li> <li>• Proper use of masks and respirators</li> </ul> Compare and contrast mask types Topic: Respirator fit testing Contents: <ul style="list-style-type: none"> <li>• The rationale for fit testing</li> </ul> Qualitative fit testing Quantitative fit testing Sensitivity test solution	<ul style="list-style-type: none"> <li>• Powerpoint presentations</li> <li>• Discussion sessions</li> <li>• Demonstrations</li> <li>• Practical exercises</li> </ul>
	<ul style="list-style-type: none"> <li>• Waste management</li> </ul> Laboratory specimens Soiled linens Needles and sharps Instrument processing/decontamination Incineration <ul style="list-style-type: none"> <li>• Facility cleaning</li> <li>• Facility evaluation</li> </ul>	
	<ul style="list-style-type: none"> <li>• Donning and doffing particulate respirators</li> <li>• Positive and negative seal checks for particulate respirators</li> </ul>	
	<ul style="list-style-type: none"> <li>• How to perform a qualitative fit test on a colleague</li> <li>• Individual/group exercise</li> </ul> Participant is fit tested Participant conducts a fit test	

TB = tuberculosis; IC = infection control; WHO = World Health Organization; HIV = human immunodeficiency virus; MDR-TB = multidrug-resistant TB; HCW = health care worker; UVGI = ultraviolet germicidal irradiation; RAC = room air cleaner.

## RESUME

**CONTEXTE :** Centre de formation à la lutte contre l'infection tuberculeuse (ICTB) du personnel de santé au sein de la région des Républiques d'Asie Centrale.

**OBJECTIF :** Evaluer les effets de cette formation réalisée au site de démonstration et de formation à l'ICTB à Machiton, Tadjikistan.

**SCHEMA :** Les participants à la formation ( $n = 89$ ) ont été invités pendant la première année de fonctionnement (avril 2014–février 2015) à participer à un entretien post formation.

**RÉSULTATS :** Des 89 participants, 84 (94%) ont terminé l'entretien et exprimé leur satisfaction vis-à-vis de la formation. Quarante-vingt (95%) participants ont dit avoir rencontré leur supérieur au travail pour discuter de la formation. Parmi eux, 69 (85%) ont dit avoir discuté des changements requis pour atteindre les normes d'ICTB. Les modifications d'ICTB que les participants ont déclaré avoir réalisé sur les lieux de travail après la

formation en termes de pratiques ont inclus la création de comités ICTB, la désignation d'une personne focale ICTB, la planification de l'ICTB, l'élaboration des politiques visant à séparer les patients contagieux dans les salles d'attente, la fourniture de masques pour les patients contagieux, des conseils de comportement en cas de toux, une meilleure disponibilité des gants, des programmes d'hygiène des mains et des affiches relatives à l'ICTB dans les salles d'attente.

**CONCLUSIONS :** La satisfaction des patients et les modifications rapportées dans les activités de l'ICTB illustrent le potentiel de ces formations à améliorer l'ICTB dans la région. A l'avenir, les formations pourraient être adaptées grâce à un cadre conceptuel structuré pour des publics spécifiques afin d'avoir un impact sur l'administration, le budget et la gestion des pratiques de l'ICTB dans les structures de santé.

## RESUMEN

**MARCO DE REFERENCIA:** El centro de formación en materia de control de la infección (IC) tuberculosa, dirigida a los profesionales de salud en la región de las Repúblicas de Asia Central.

**OBJETIVO:** Evaluar la repercusión de la enseñanza impartida por el centro sobre el IC tuberculosa de Machiton, en Tayikistán.

**MÉTODO:** Se invitó a los profesionales que siguieron la formación durante el primer año de actividades del centro ( $n = 89$ ; de abril del 2014 a febrero del 2015) a tomar parte en una entrevista posformación.

**RESULTADOS:** Ochenta y cuatro de los 89 participantes completaron la entrevista (94%) y expresaron su satisfacción con la capacitación. Ochenta participantes (95%) refirieron haber compartido la experiencia adquirida en la formación con las esferas directivas en su lugar de trabajo y 69 de ellos (85%) examinaron la necesidad de modificar las prácticas a fin de satisfacer las normas exigidas por el IC tuberculosa. Las modificaciones introducidas después de la capacitación

consistieron en la creación de comités de IC tuberculosa, la designación de una persona de contacto en la materia, la planificación del IC, las directrices de separación de los pacientes contagiosos en las salas de espera, la provisión de mascarillas a los pacientes contagiosos, las normas sobre las precauciones al toser, la mayor disponibilidad de guantes, los programas de higiene de las manos y la exposición de afiches sobre el IC tuberculosa en las salas de espera.

**CONCLUSIÓN:** La satisfacción de los participantes y la comunicación de modificaciones en las prácticas vigentes ponen de relieve la posibilidad que ofrece esta formación de mejorar el IC tuberculosa en la región. En el futuro, las formaciones se pueden adaptar a un público destinatario más específico, introduciendo un marco conceptual estructurado, con el objeto lograr un impacto en la administración, el financiamiento y la gestión de las prácticas de IC tuberculosa en los establecimientos.